

# Lab 4

**Jordan Small**

November 12, 2023

CDA 3203 Computer Logic Design

Spring 2023

Dr. Maria Petrie

Florida Atlantic University

## Part 1.

```

edit: C:\emu8086\MyBuild\Part1_SmallJordan.asm
file edit bookmarks assembler emulator math ascii codes help
new open examples save compile emulate calculator convertor options help about

01 ; CDA3203 Dr. Petrie Fall 2023
02 ; Jordan Small - Z23465928
03 ; Part 1
04 ORG 100h ; required directive for 1 segment .com
05 MOV AX, 0B800h ; set AX = hexadecimal value B800h
06 MOV DS, AX ; set DS = value in AX
07 MOV CL, 'A' ; set CL = ASCII code of 'A' = 65 = 41h
08 MOV CH, 1101_1111b ; set CH = fore/background colors
09 MOV BX, 15Eh ; set BX to offset 15Eh
10 MOV [BX], CX ; memory B800:015E = CX (ASCII char)
11 RET ; returns control to operating system.

assembler status
external view

Assembled in 1 passes. Time spent: 0.007 seconds.
"Part1_SmallJordan.com" is assembled successfully into 15 bytes.

Listing is saved: "Part1_SmallJordan.com.list"
Symbol table is saved: "Part1_SmallJordan.com.symbol"

```

Write the HEX Machine Code for each Assembly Instruction

1. MOV AX, 0B800h **B8 00 B8**
2. MOV DS, AX **8E D8**
3. MOV CL, 'A' **B1 41**
4. MOV CH, 1101\_1111b **B5 DF**
5. MOV BX, 15Eh **BB 5E 01**
6. MOV [BX], CX **89 0F**
7. RET **C3**

8. The CS:IP address of the first instruction is **0700:0100**

9. The CS:IP address of the last instruction is **0700:010E**

10. What is the Effective Address of the first instruction?  
Show work of how you calculated the physical address.

$$\begin{aligned}
 &CS(0700) \quad 0000\ 0111\ 0000\ 0000\ 0000 \\
 &+ IP(0100) \quad + \quad 0000\ 0001\ 0000\ 0000 \\
 &\hline
 &0000\ 0111\ 0001\ 0000\ 0000 \Rightarrow \boxed{07100}
 \end{aligned}$$

```

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03 ; Part 1
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05 MOV AX, 0B800h ; set AX = hexadecimal value B800h
06 MOV DS, AX ; set DS = value in AX
07 MOV CL, 'P' ; set CL = ASCII code of 'P' = 80 = 41h
08 MOV CH, 1101_1111b ; set CH = fore/background colors
09 MOV BX, 15Eh ; set BX to offset 15Eh
10 MOV [BX], CX ; memory B800:015E = CX (ASCII char)
11 RET ; returns control to operating system.

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```

emulator: Part1\_SmallJordan.com\_

file math debug view external virtual devices virtual drive help

Load reload step back single step run step delay ms: 0

registers	H	L
AX	00	00
BX	00	00
CX	00	0F
DX	00	00
CS	0700	
IP	0100	
SS	0700	
SP	FFFE	
BP	0000	
SI	0000	
DI	0000	
DS	0700	
ES	0700	

0700:0100	0700:0100
07100: B8 184 1	MOV AX, 0B800h
07101: 00 000 NULL	MOV DS, AX
07102: B8 184 1	MOV CL, 050h
07103: 8E 142 1	MOV CH, 0DFh
07104: D8 216 1	MOV BX, 0015Eh
07105: B1 177 1	MOV [BX], CX
07106: 50 080 P	RET
07107: B5 181 1	NOP
07108: DF 223 1	NOP
07109: BB 187 1	NOP
0710A: 5E 094 1	NOP
0710B: 01 001 0	NOP
0710C: 89 137 1	NOP
0710D: 0F 015 1	NOP
0710E: C3 195 1	NOP
0710F: 90 144 1	NOP
07110: 90 144 1	NOP
07111: 90 144 1	NOP
07112: 90 144 1	NOP
07113: 90 144 1	NOP
07114: 90 144 1	NOP
07115: 90 144 1	NOP

screen source reset aux vars debug stack flags

emulator screen (80x25 chars)

message

PROGRAM HAS RETURNED CONTROL TO THE OPERATING SYSTEM

OK

clear screen change font 0/16

flags

CF 0

ZF 0

SF 0

OF 0

PF 0

AF 0

IF 1

DF 0

analyse

\*\*\*AFTER RUN\*\*\*

Random Access Memory

0700:0100

update

☒ table
☐ list

0700:0100	A0	0D	01	8A	1E	0E	01	F6-E3	A3	0F	01	C3	00	00	00	á.0e▲00:1100
0700:0110	00	90	90	90	90	90	90	90-90	90	90	90	90	90	90	90	00
0700:0120	90	90	90	90	90	F4	00	00-00	00	00	00	00	00	00	00	ÉÉÉÉÉÉÉÉÉÉÉÉ
0700:0130	00	00	00	00	00	00	00	00-00	00	00	00	00	00	00	00	.....
0700:0140	00	00	00	00	00	00	00	00-00	00	00	00	00	00	00	00	.....
0700:0150	00	00	00	00	00	00	00	00-00	00	00	00	00	00	00	00	.....
0700:0160	00	00	00	00	00	00	00	00-00	00	00	00	00	00	00	00	.....
0700:0170	00	00	00	00	00	00	00	00-00	00	00	00	00	00	00	00	.....

\*\*\*  
BEFORE  
RUN  
\*\*\*

Random Access Memory

F400:0154

update

☒ table
☐ list

F400:0154	CF	00	00	00	00	00	00	00-00	00	00	00	FF	FF	CD	1A	±.....=
F400:0164	CF	00	00	00	00	00	00	00-00	00	00	00	FF	FF	CD	00	±.....=
F400:0174	CF	00	00	00	00	00	00	00-00	00	00	00	FF	FF	CD	04	±.....=
F400:0184	CF	00	00	00	00	00	00	00-00	00	00	00	FF	FF	CD	10	±.....=
F400:0194	CF	00	00	00	00	00	00	00-00	00	00	00	FF	FF	CD	12	±.....=
F400:01A4	CF	00	00	00	00	00	00	00-00	00	00	00	FF	FF	CD	13	±.....=
F400:01B4	CF	00	00	00	00	00	00	00-00	00	00	00	FF	FF	CD	16	±.....=
F400:01C4	CF	00	00	00	00	00	00	00-00	00	00	00	FF	FF	CD	14	±.....=

\*\*\*  
AFTER  
RUN  
\*\*\*

Part2\_SmallJordan.com\_symbol - Notepad

File Edit Format View Help

< THE SYMBOL TABLE >

Part2\_SmallJordan.com\_ -- emu8086 assembler version: 4.08

Name	Offset	Size	Type	Segment
FIRST	0010D	1	VAR	(NOSEG)
LAST	0010E	1	VAR	(NOSEG)
RESULT	0010F	2	VAR	(NOSEG)

[ 11/12/2023 -- 8:48:55 PM ]

< END >

Ln 1, Col 1100%Windows (CRLF)UTF-8

variables

size: word

elements: 1

edit

show as: unsigned

FIRST	23
LAST	28
RESULT	644

Confirmation SPOT Survey was completed

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Section: 001  
CRN: 10369

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STA4821

Stochastic Models for CS  
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Section: 006  
CRN: 14073

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CDA3203

Computer Logic Design  
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Section: 005  
CRN: 15065

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